METHOD, APPARATUS AND PROGRAM FOR IMAGE CLASSIFICATION

BACKGROUND OF THE INVENTION

Field of the Invention

5   The present invention relates to a method and apparatus for classifying image data sets. The present invention relates also to a program that causes a computer to execute the method for classifying image data sets.

Description of the Related Art

10   Storage of image data sets obtained by digital cameras, or by scanning images recorded on negative films, is common. However, as the number of image data sets increases, organization thereof becomes troublesome. Particularly, in the case of digital cameras, a great number of image data sets are obtained because there is no charge for film. As a result, 15 the organization of image data sets becomes extremely troublesome. For this reason, methods for automatically classifying image data have been proposed. Examples of such methods include: those in which image data sets are classified 20 according to the medium in which they were recorded; those in which image data sets are classified according to the film from which they were obtained; and those in which image data sets are classified in hierarchical folders representing year, month, and day. U.S. Patent No. 5,805,215 discloses a digital 25 camera which refers to a database that manages a personal schedule, to classify image data sets according to personal

events, based on date data that represents dates of photography attached to the image data sets. Users are enabled to efficiently organize image data sets by employing automatic classification methods such as those described above.

5   However, in the digital camera disclosed in U.S. Patent No. 5,805,215, image data sets are classified according to personal events. Therefore, the digital camera cannot be shared with another person. That is, a database that manages a personal schedule is employed in the classification of image

10   data sets. Accordingly, in the case that the digital camera is owned by the father of a family, classification of image data sets is only possible regarding the father's personal events. If the digital camera was shared even with family members, such as a son, image data sets can not be classified.

15   SUMMARY OF THE INVENTION

The present invention has been developed in view of the above circumstances. It is an object of the present invention to enable classification of image data sets even when a device for managing image data sets, such as a digital camera, is

20   shared among plurality of people.

The method of classifying image data sets according to the present invention is a method for classifying image data sets, to which date data that represents the date of photography are attached, comprising the steps of:

25   obtaining the date data from the image data sets;

selecting an event corresponding to the date of

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photography from a database of events, in which events that relate to each of a plurality of people are stored, correlated with dates of the events; and

correlating the image data sets with the corresponding event.

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Note that the method of classifying image data sets according to the present invention may be a method wherein:

selection of a single database from among a plurality of databases is received in the case that a plurality of databases exist; and

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the corresponding event is selected from events stored in the selected database.

In addition, the method of classifying image data sets according to the present invention may be a method wherein:

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a plurality of corresponding events are displayed in the case that a plurality of corresponding events, correlated with dates represented by the date data, are related to the plurality of people;

selection of a single corresponding event from among the plurality of corresponding events is received; and

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the image data sets are correlated to the selected corresponding event.

Here, "...the case that a plurality of corresponding events...are related to the plurality of people..." refers not only to the case in which a plurality of corresponding events exist for all of the plurality of people, but includes cases

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in which corresponding events exist for a portion of the plurality of people.

The image classifying apparatus according to the present invention is an image data set classifying apparatus for classifying image data sets, to which date data that represents the date of photography are attached, comprising:

a data obtaining means for obtaining the date data from the image data sets;

a storage means for storing a database of events, in which event that relate to each of a plurality of people are correlated with dates of the events;

a selecting means for selecting an event corresponding to the date of photography from the database, based on the date of photography represented by the date data; and

a correlating means for correlating the image data sets with the corresponding event selected by the selecting means.

Note that the image classifying apparatus according to the present invention may further comprise:

a database selecting means for selecting a single database from among a plurality of databases in the case that a plurality of databases exist; wherein

the selecting means selects the corresponding event from among events stored in the selected database.

In addition, the image classifying apparatus according to the present invention may further comprise:

a display means for displaying a plurality of

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corresponding events in the case that a plurality of corresponding events, correlated with dates represented by the date data, are related to the plurality of people; and

a selection receiving means for receiving selection of a single corresponding event from among the plurality of corresponding events; wherein

the correlating means correlates the image data sets with the selected corresponding event.

Note that the method for classifying image data sets maybe provided as a program that causes a computer to execute the method. The program may be recorded in a computer readable recording medium. A skilled artisan would know that computer readable media are not limited to any specific type of storage device and includes any kind of device, including but not limited to: CD's, floppy disks, RAM's ROM's, hard disks, magnetic tapes and internet downloads, in which computer instructions can be stored and/or transmitted. Transmission of computer code through a network or through wireless transmission means is also within the scope of the present invention. Additionally, computer code/instructions include but are not limited to source, object, and executable code. The code may be in any language, including higher level languages, assembly language, and machine language.

According to the present invention, date data are obtained from image data sets. Then, an event corresponding to the date of photography represented by the date data is

selected from a database of events, in which events that relate to each of a plurality of people are stored, correlated with dates of the events. Then, the image data sets are correlated with the selected corresponding event. Therefore, image data

5   sets can be correlated to events related to each of the plurality of people. This can be accomplished by creating a database, in which events that relate to each of a plurality of people, who share a device such as a digital camera, are stored, correlated with dates of the events. Correlation is

10   performed by referring to the database. Accordingly, if the present invention is applied to a device such as a digital camera, image data sets can be classified according to events for each of a plurality of people, even if the device is shared among them.

15   In the case that there are a plurality of databases, selection of a single database from among the plurality of databases is received. Then, the corresponding event is selected by referring to the selected database. Thereby, the image data sets can be classified by referring to a database

20   suitable for classification thereof.

         In the case that there are a plurality of events, related to the plurality of people, that correspond to the date of photography represented by the date data, the plurality of corresponding events are displayed. Selection of a single

25   event from among the plurality of displayed events is received. Then, the image data sets are correlated to the selected

corresponding event. Thereby, the image data sets can be classified in a manner that reflects the intentions of the user who is classifying the image data sets.

BRIEF DESCRIPTION OF THE DRAWINGS

5   Figure 1 is a schematic block diagram illustrating the construction of a digital camera which is an image classifying apparatus according to an embodiment of the present invention.

Figure 2 shows an example of the structure of a database stored in a memory.

10   Figure 3A and Figure 3B show an LCD monitor in a state in which names of corresponding events are displayed thereon.

Figure 4 shows the LCD monitor in a state in which names of databases are displayed thereon.

Figure 5 is a flow chart illustrating the procedures

15   performed by the embodiment of the present invention.

Figure 6 shows folders corresponding to events, in which image data sets are stored.

Figure 7 is a schematic diagram showing the structure of an image storage system, which is an image classification

20   apparatus according to another embodiment of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Hereinafter, embodiments of the present invention will be described with reference to the attached drawings. Figure

25   1 is a schematic block diagram illustrating the construction of a digital camera 1 which is an image classifying apparatus

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according to an embodiment of the present invention. As shown in Figure 1, the digital camera 1 comprises: an imaging portion 11 for obtaining image data sets S0 by photography; a liquid crystal display (LCD) monitor 12 for displaying the image data sets S0 and the like; an operating portion 13 for performing various types of input, comprising operation keys, a cruciform key and the like; a card interface 14 for mounting a memory card 2 for recording the image data sets S0 therein; a memory 15 for storing a database DB to be described later, as well as a program for classifying images; and a control portion 16 for controlling the operations of the digital camera 1, such as photography operations, display operations, and storage operation of the image data sets S0.

The imaging portion comprises: a photography lens; a zoom mechanism; a shutter; a CCD; and the like. Image data sets S0 representing images of subjects are obtained by driving the shutter to perform photography. At this time, date data, that represents the date of photography, is attached to the image data sets S0 by being written into the tag information thereof. Note that the date data may alternatively be attached to the image data sets S0 by being saved as separate files, which are correlated to the image data sets.

The LCD monitor 12 displays information necessary for the operation of the digital camera 1, in addition to the image data sets S0.

The card interface 14 saves the image data sets S0 in

the memory card 2 during photography, and reads out the image

data sets S0 from the memory card 2 during classification

thereof.

The control portion 16 executes the program stored in

5   the memory 15 when a command to classify the image data sets

S0 is input by a user via the operating portion 13. Then, the

image data sets S0 are classified by referring to the database

DB, also stored in the memory 15, with the date data attached

to the image data sets S0.

10   Figure 2 shows an example of the structure of the database

DB stored in the memory 15. As shown in Figure 2, events related

to family members (father, mother, and son) are stored,

corresponding to the dates of the events, in the database DB.

The events are stored in chronological order, and only events

15   related to the father and mother exist, prior to the birth of

their son. In the database DB of Figure 2, the event "birth

of son" is stored, related to the father, the mother, and the

son, corresponding to the date of June 20, 1999.

In the case that the date represented by the date data

20   attached to image data sets S0 to be classified is June 20,

1999, the event "birth of son" is commonly related to the father,

the mother, and the son in the database DB. Therefore,

"Father", "Mother", and "Son" are displayed on the LCD monitor

12, as shown in Figure 3A. The user of the digital camera 1

25   is prompted to input a command that selects with whose event

the image data sets S0 are to be correlated. For example, if

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the image data sets S0 are being classified by the father, by selecting "Father", they are correlated with the event related to him.

In the case that the date represented by the date data attached to image data sets S0 to be classified is July 14, 2006 the events "Golf", "Trip", and "Field Trip" are related to the father, the mother, and the son, respectively. Therefore, "Golf (Father)", "Trip (Mother)", and "Field Trip (Son)" are displayed on the LCD monitor 12 as shown in Figure 3B. The user of the digital camera 1 is prompted to input a command that selects with which event the image data sets S0 are to be correlated. For example, if the image data sets S0 are being classified by the mother, by selecting "Trip (Mother)", they are correlated with the event "Trip", related to her.

Note that a plurality of databases DB are stored in the memory 15. Specifically, a case is assumed in which a family K and a family S share the digital camera 1. In this case, a database for the family K (DBk) and a database for the family S (DBs) are stored in the memory 15, to enable correlation of events and image data sets S0 separately for each family. In the case that a plurality of databases, such as database DBk and database DBs, are stored in the memory 15 in this manner, the names of the databases DBk and DBs are displayed on the LCD monitor 12. The user is prompted to input a command to select the database to be utilized for the classification of

image data sets S0. Note that instead of displaying the names

of the databases DBk and DBs, the database to be utilized for

the classification of image data sets S0 may be selected by

directly inputting the name thereof via the operating portion

5   13.

Next, the processes performed in the present embodiment

will be described. Figure 5 is a flow chart illustrating the

processes performed in the present embodiment. Note that here,

a case is assumed in which a plurality of image data sets S0

10   have been obtained by photography and stored in the memory card

2. First, the control portion 15 monitors whether the user

has input a command to classify the image data sets S0 (Step

S1). When the user inputs the command to classify the image

data sets S0 (S1=YES), selection of the image data sets to be

15   classified (image data sets SC) is received (Step S2). The

selection may be performed by the user inputting the file names

of the image data sets SC using the operating portion 13.

Alternatively, thumbnail images of the image data sets S0,

which are stored in the memory card 2, are displayed on the

20   LCD monitor 12, and the user may select image data sets SC to

be classified from among the displayed thumbnail images. Note

that here, it is assumed that a plurality of image data sets

SCi (i=1~n) have been selected to be classified.

Thereafter, the names of the plurality of databases DB,

25   which are stored in the memory 15, are displayed on the LCD

monitor 12 (Step S3). The control portion 16 initiates

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monitoring of whether the user has input a command to select a database DB to be utilized for classification (Step S4). When the result of monitoring is affirmative (Step S4=YES), the classification process is initiated.

5   The image data sets SBi to be classified are sorted in order of their file names, and image data set SB1 (i=1) is set as the first image data set to be classified (Step S5). Then, an event corresponding to the date of photography, represented by the date data attached to the image data set SB1, is selected

10   from the database DB (Step S6). Specifically, the date of photography, represented by the date data, is compared with the dates of the events stored in the database DB, and all of the events that match the date of photography are selected as corresponding events.

15   Next, the control portion 16 judges whether there are a plurality of corresponding events (Step S7). If a plurality of corresponding events exist (S7=YES), the plurality of corresponding events are displayed on the LCD monitor 12 (Step S8). Specifically, the names of the plurality of selected

20   corresponding events are displayed on the LCD monitor 12, as shown in Figure 3A and Figure 3B.

       Then, the control portion 16 initiates monitoring of whether the user has input a command to select a corresponding event to be utilized for classification (Step S9). When the

25   result of monitoring is affirmative (S9=YES), the corresponding event for which a selection command has been

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input is correlated with the image data set SBi (Step S10).

Specifically, the selected corresponding event is described

in the tag information of the image data set SBi. Thereafter,

a judgment is made regarding whether all of the image data sets

5   SBi have been classified (Step S11). If the result of judgment

is negative (S11=NO), i is incremented by 1 to change the image

data set to be classified to the next image data set SBi+1 (Step

S12), and the process returns to step S6. If the judgment in

step S11 is affirmative (S11=YES), the process ends.

10   Note that in the case that the judgment in step S7 is

negative (S7=NO), there is only one selected corresponding

event. Therefore, the process proceeds to step S10, and the

selected corresponding event is correlated with the image data

set SBi.

15   Here, the corresponding event is correlated with the

image data sets SBi by describing the corresponding event in

the tag information of the image data sets SBi. Alternatively,

the corresponding event may be correlated with the image data

sets SBi by being saved in folders corresponding to the

20   corresponding events, as shown in Figure 6.

As described above, in the present embodiment, an event

corresponding to the date of photography represented by the

date data, attached to image data sets S0, is selected from

a database of events, in which events that relate to each of

25   a plurality of people are stored, correlated with dates of the

events. Then, the image data sets are correlated with the

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selected corresponding event. Therefore, image data sets can be correlated to events related to each of the plurality of people who share the digital camera 1. This can be accomplished by creating a database, in which events that relate to each of the plurality of people are stored, correlated with dates of the events. Correlation is performed by referring to the database. Accordingly, even if the digital camera 1 is shared among the plurality of people, image data sets can be classified according to events for each of the plurality of people.

In the case that there are a plurality of databases DB, selection of a single database from among the plurality of databases is received. Then, the corresponding event is selected by referring to the selected database. Thereby, the image data sets S0 can be classified by referring to a database suitable for classification thereof.

In the case that there are a plurality of events, related to the plurality of people, that correspond to the date of photography represented by the date data, the plurality of corresponding events are displayed on the LCD monitor 12. Selection of a single event from among the plurality of displayed events is received. Then, the image data sets S0 are correlated to the selected corresponding event. Thereby, the image data sets S0 can be classified in a manner that reflects the intentions of the user who is classifying the image data sets S0.

Note that in the embodiment described above, the image

data sets S0, which are stored in the memory card 2 of the

digital camera 1, are correlated with the events. However,

the present invention may be applied to an image storage system

5   as illustrated in Figure 7, wherein a personal computer 20,

which is shared by family members, accesses an image server

21, which stores image data sets S0 of the family, to correlate

the image data sets S0 to events. In this case, the image server

21 stores the database DB illustrated in Figure 2. The image

10   data sets S0 may be classified by a user inputting commands

for selection of the database DB to be utilized for

classification, as well as for selection of events, from the

personal computer 20. The image server 21 then correlates the

selected events with the image data sets S0.